

Two new species of *Aktedrilus*
(Oligochaeta, Tubificidae)
from the West Atlantic

by Christer ERSÉUS

Abstract. — *Aktedrilus dentatus* sp. nov. and *A. martiniquensis* sp. nov. are described from Brazil and Martinique/Guadeloupe, respectively. Both species are littoral marine and interstitial. *A. dentatus* is provided with tooth-shaped, highly cuticularized penes, and it is the first species of *Aktedrilus* with the spermatheca located in segment IX. *A. martiniquensis* is closely related to the North Pacific *A. longitubularis* Finogenova and Shurova, 1980, but differs from that species in having single-pointed (not bifid) posterior setae, pharyngeal glands extending into segment VII or VIII (into VI only in *A. longitubularis*), and spermatozoa partly embedded in the spermathecal wall. A slightly modified definition of *Aktedrilus* is provided.

Résumé. — Description de deux espèces nouvelles interstitielles et littorales : *Aktedrilus dentatus* n. sp. du Brésil et *A. martiniquensis* n. sp. de la Martinique et de la Guadeloupe. *A. dentatus* possède un pénis très cuticularisé et en forme de dent ; c'est la première espèce d'*Aktedrilus* dont les spermathèques sont situées au segment IX. *A. martiniquensis* est très voisine de *A. longitubularis* Finogenova et Shurova, 1980, du Pacifique Nord, mais en diffère par des soies postérieures simples (non bifides), des glandes pharyngiennes s'étendant dans les segments VII ou VIII (en VI seulement chez *A. longitubularis*) et des spermatozoïdes partiellement enrobés dans la paroi de la spermathèque. Une définition légèrement modifiée d'*Aktedrilus* est donnée.

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INTRODUCTION

The marine genus *Aktedrilus* Knöllner, 1935, comprises a number of meiobenthic, littoral species of Tubificidae. *A. monospermathecus* Knöllner, 1935, was long the only known member of *Aktedrilus*, but during the last few years, the number has increased to twelve species (ERSÉUS, 1980a, *in press* ; ERSÉUS and KOSSMAGK-STEPHAN, 1982 ; FINOGENOVA, 1976 ; FINOGENOVA and SHUROVA, 1980 ; STREHLOW, 1982). The species are known from the Atlantic, the Mediterranean and Caspian seas, and the North and South Pacific.

While studying oligochaete material received from the Muséum national d'Histoire naturelle (MNHN), Paris (courtesy of J. RENAUD-MORNANT), two new species of *Aktedrilus* were found. One of them had been collected near Buzios, Brazil, the other species at Martinique and Guadeloupe in the West Indies. Both are described in the present paper, which also contains a slightly modified definition of the genus.

The specimens had been fixed in formalin by the collectors. They were all stained in paracarminé and mounted whole in Canada balsam by the author. The type series of both species are deposited in the MNHN.

Abbreviations in the figures

a, atrium ; c, collar ; mp, male pore ; p, penis ; pr 1, anterior prostate ; pr 2, posterior prostate ; ps, penial sac ; s, spermatheca ; vd, vas deferens.

SYSTEMATIC DESCRIPTIONS

Genus **AKTEDRILUS** Knöllner, 1935

DEFINITION (slightly modified after ERSÉUS, 1980a.)

A group of meiobenthic, commonly littoral, marine tuhilicids. Hair setae absent. Modified genital setae absent. Male pores paired, located in line with ventral setae in posterior part of segment XI. Spermathecal pore unpaired, mid-dorsal, located in posterior-most part of IX (in *A. dentatus* sp. nov.), or in anterior-most part of X. Coelomocytes, if present, small and sparse, not of the "Rhyacodriline-type".

Normal alimentary canal present. Male efferent ducts paired in XI. Vasa deferentia ciliated and narrow, joining ental ends of atria. Atria slender, but clearly wider than vasa deferentia. Prominent penes present, with or without cuticular sheaths. Two pairs of prostate glands present. Anterior pair attached to ental end of atria, at entrances of vasa deferentia. Posterior pair either discretely attached to most ectal end of atria or more broadly attached to bases of penes and/or walls of penial sacs. Spermatheca unpaired. Spermathecal ampulla smaller than duct in many species. Sperm random in spermatheca : in some species partly embedded in spermathecal wall. Spermatophores absent.

TYPE SPECIES : *Aktedrilus monospermathecus* Knöllner, 1935.

***Aktedrilus dentatus* sp. nov.**

(Figs. 1-2)

HOLOTYPE : MNHN n° AS 716, from Juan Faema beach, near Buzios, Brazil, 22°10' S, 40° 45' W, mineral medium sand at 30 cm depth, mid-intertidal (coll. J. RENAUD-MORNANT ; 15 Oct. 1976).

PARATYPE : MNHN n° AS 717, from northern side of Juan Faema beach, upper intertidal (coll. J. RENAUD-MORNANT ; Nov. 1976).

DESCRIPTION

Length (fixed specimens) 2.4 mm, 35-36 segments. Diameter at XI (slightly compressed, fixed specimens), 0.07-0.16 mm. Prostomium spherical, conspicuous. Epidermal

adhesive glands not observed. Clitellum extending over 1/2X-XII. Setae bifid, with upper tooth thinner and shorter than lower (fig. 1 A). Bifids 25-35 μ m long, about 1.5 μ m thick at node, 3-4 per bundle anteriorly, (1)2-3 per bundle posteriorly. Spermathecal pore located immediately anterior to intersegmental furrow IX/X.

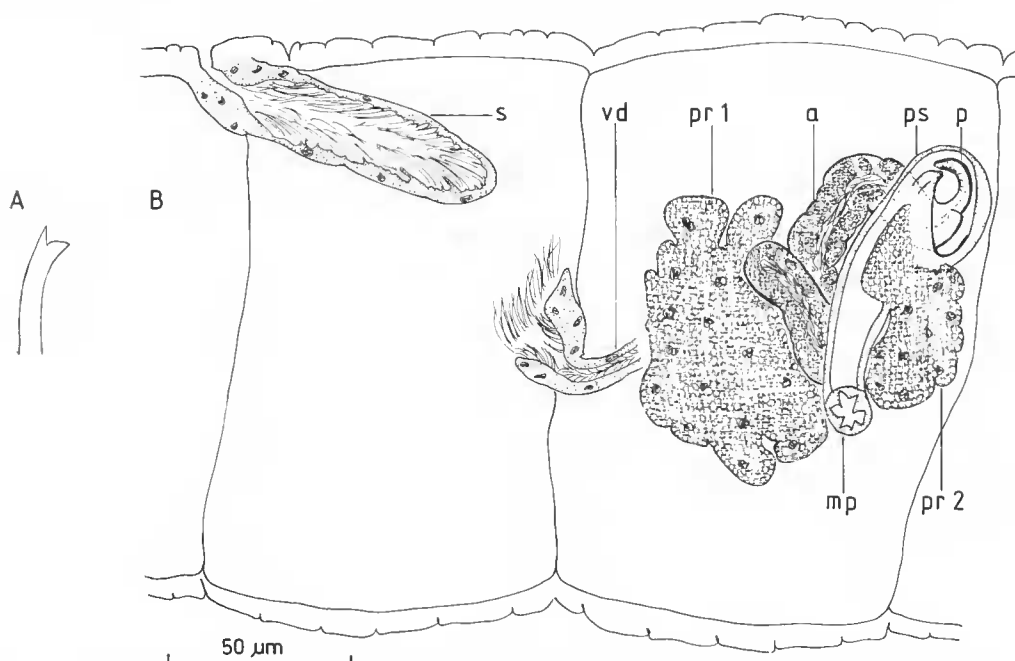


FIG. 1. — *Aktedrilus dentatus* sp. nov. A, free-hand drawing of seta ; B, lateral view of spermatheca and male genitalia (holotype).

Pharyngeal glands present in IV-VIII. Male genitalia (all structures paired) (fig. 1 B, 2) : vas deferens about 7 μ m wide, length unknown ; atrium cylindrical, slender, 10-15 μ m wide, about 100 μ m long (exact length difficult to establish), and consisting of very thin outer lining of muscles and granulated inner epithelium ; anterior prostate gland large, attached to ental end of atrium ; penis highly cuticularized, resembling a curved tooth (hence the name *dentatus*, Latin : provided with teeth) ; penis 30-35 μ m long, basally 10-14 μ m wide, ectally only 3-4 μ m wide, narrow ectal part distinctly set off from wider ental part ; an irregular collar of thickened cuticle surrounding base of penis (best shown in fig. 2 B) ; penis enclosed in deep penial sac opening to exterior through inconspicuous pore ; posterior prostate compact and small, broadly attached to elongated papilla in posterior wall of deep penial sac. Spermatheca (fig. 1 B, s) slender, straight, about 20 μ m wide, 90-105 μ m long, lacking distinct duct ; sperm peripheral in spermatheca and partly embedded in spermathecal wall.

HABITAT AND DISTRIBUTION : Marine, intertidal sand ; known only from the type locality (SE Brazil).

REMARKS : *Aktedrilus dentatus* sp. nov. is unique within the genus in having the spermathecal pore in (most posterior part of) segment IX, not anteriorly in X as in the other species. The morphology of the penes is also quite distinct. Small, strongly cuticularized penes are present also in *A. oregonensis* Strehlow, 1982, but they are evenly tapering and curved in that species, not abruptly narrowing at middle as in *A. dentatus*.

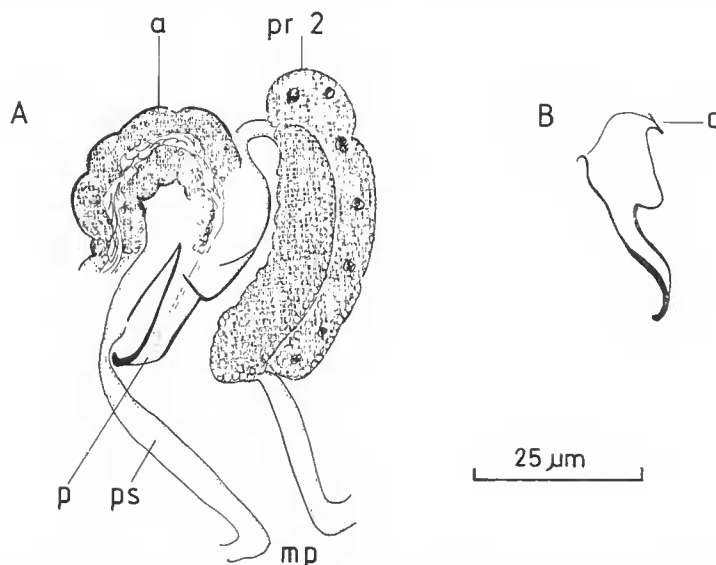


FIG. 2. — *Aktedrilus dentatus* sp. nov. A, parts of male genitalia (paratype) ; B, penis sheath of other side of worm (paratype).

***Aktedrilus martiniquensis* sp. nov.**

(Fig. 3)

HOLOTYPE : MNHN n° AS 718, from Grande Anse, le Carbet, Martinique, 14°42.4' N, 61°11.3' W, high energy beach with steep slope, volcanic sand, mid-intertidal (coll. J. RENAUD-MORNANT and N. GOURBAULT ; 17 Feb. 1981).

PARATYPES : MNHN n° AS 719-720, two specimens from the type locality.

OTHER MATERIAL (author's collection) : Two specimens from the type locality ; and one specimen from beach at Porte d'Enfer, Grande-Terre, Guadeloupe, 16°29.6' N, 61°26.2' W, medium coralline sand with algal debris, intertidal (coll. J. RENAUD-MORNANT and N. GOURBAULT ; 17 Apr. 1979).

DESCRIPTION

Length (fixed specimens) 3.2-4.0 mm, 49-61 segments. Diameter at XI (slightly compressed, fixed specimens), 0.09-0.23 mm. Prostomium longer than wide, conspicuous. Epidermal adhesive glands not observed. Clitellum extending over 1/2X-XII.

Anterior setae bifid, with upper tooth thinner and shorter than lower (fig. 3 A). Posterior setae sharply single-pointed, with strongly curved tips (fig. 3 B). In mid-body, dorsal setae of single-pointed, ventral setae of bifid type. Setae 20-40 μm long, 1-2 μm thick at node, 3-4 per bundle in pre-elitellar segments, generally 3 per bundle in segments immediately posterior to elitellum, 2 per bundle thereafter. Spermathecal pore located immediately posterior to intersegmental furrow IX/X.

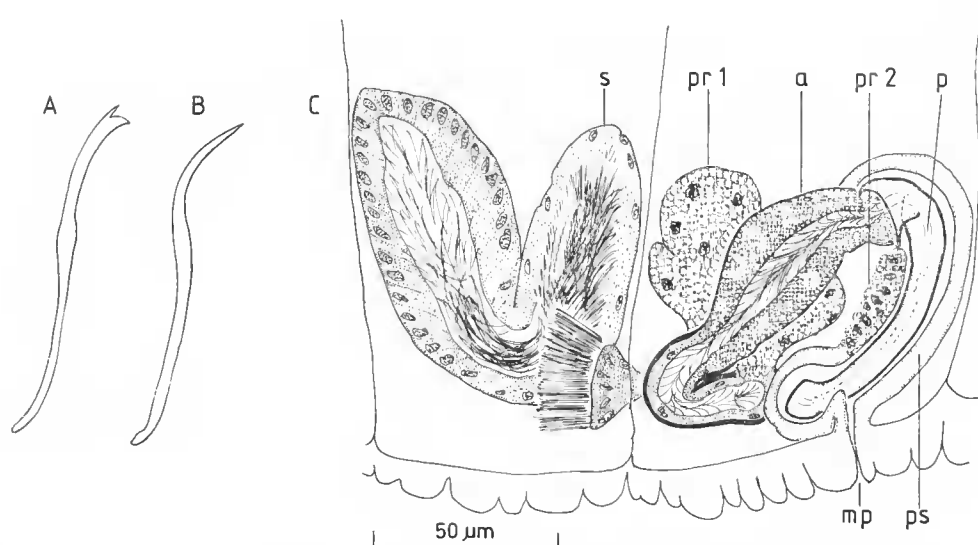


FIG. 3. — *Aktedrilus martiniquensis* sp. nov. A, free-hand drawing of anterior seta ; B, free-hand drawing of posterior seta ; C, lateral view of spermatheca and male genitalia (holotype).

Pharyngeal glands well developed, extending into VII or VIII. Male genitalia (paired in most specimens ; those of one side not developed in two specimens examined) (fig. 3 C) : vas deferens not observed ; atrium tubular, bipartite ; ental part of atrium 60-90 μm long, about 14 μm wide, with thick muscular lining, but without granules in inner epithelium ; ectal part of atrium 60-80 μm long, about 27 μm wide, with very thin outer lining, and granulated inner epithelium ; anterior prostate gland compact and large, attached to ental end of atrium ; penis curved and elongated funnel-shaped, with cuticular sheath ; penis 80-105 μm long, diameter 14-20 μm at base, 6-8 μm at middle, 7-12 μm at tip ; inner end of cuticular sheath forming an asymmetrical collar at base of penis ; penis enclosed in penial sac opening to exterior through inconspicuous pore ; posterior prostate small, as a glandular pad in anterior wall of penial sac, immediately ventral to base of penis. Spermatheca (fig. 3 C, s) large and slender, indistinctly divided into a duet-like ectal portion, and an ental ampulla ; spermatheca totally about 150 μm long, duet 33-40 μm wide, ampulla 28-31 μm wide ; sperm loose and scattered in duet, dense and partly embedded in wall of ampulla.

HABITAT AND DISTRIBUTION : Marine, intertidal sand ; Martinique and Guadeloupe (West Indies).

REMARKS : *Aktedrilus martiniquensis* sp. nov. is closely related to *A. longitubularis*, which was described from the sea of Japan by FINOGENOVA and SHUROVA (1980) ; the male ducts and penes are virtually identical in the two species. However, although the type series of *A. longitubularis* has not been accessible for my examination, the available information strongly suggests that the new form is a separate species. Firstly, the characteristics, single-pointed posterior setae (fig. 3 B) found in *A. martiniquensis* are not present in *A. longitubularis* (FINOGENOVA, *pers. comm.*). Secondly, the pharyngeal glands are extending into VII or VIII in *A. martiniquensis*, but into VI only in the other species. The spermatheca of *A. longitubularis* was depicted by FINOGENOVA and SHUROVA (*op. cit.* : fig. 8), but the illustration neither reveals the inner morphology of the ampulla, nor does it show the nature of the sperm. However, Dr. FINOGENOVA (*pers. comm.*) has confirmed that the spermatheca of *A. longitubularis* is different from that shown for *A. martiniquensis* in fig. 3 C ; e.g., sperm are not embedded in the spermathecal wall in *A. longitubularis*.

DISCUSSION

By definition, tubificids have their (generally paired) spermathecae in segment X. However, as now shown for a number of marine species of the family, there are deviations from this rule. *Phallodrilus postspemathecatus* Erséus, 1980, and *Heterodriloides quadrithecatus* Erséus, 1981, have spermathecae in segment XII, i.e. posterior to the segment bearing the male ducts (ERSÉUS, 1980b, 1981), *Uniporodrilus granulothecus* Erséus, 1979, possesses an unpaired spermatheca opening mid-ventrally in the most posterior part of segment IX (ERSÉUS, 1979), and finally, in *Aktedrilus dentatus* sp. nov., the spermatheca is mid-dorsal, with its pore in the most posterior part of IX. In the case of the latter species, the deviating location of the pore is merely a slight forward shift from the position found in the other species of *Aktedrilus*, in which the opening is immediately posterior to the intersegmental furrow between IX and X (cf. fig. 3 ; ERSÉUS, 1980a : figs. 1, 3-5, 7-9).

The species of *Aktedrilus* are typical members of the subfamily Phallodrilinae in that they possess two "prostate glands" per male duct. A prostate gland in the strict sense is lump of glandular elements, which are the outer parts of elongated cells of the inner atrial epithelium (cf. FLEMING, 1981). In most of the biprostate phallodrilines, there is an anterior prostate attached to the ental end (or anterior face) of the atrium, and a posterior, similar prostate connected by a stalk to the ectal end (or posterior face) of the atrium proper. This is the case in, for instance, *Aktedrilus svetlovi* Finogenova, 1976, *A. floridensis* Erséus, 1980, *A. locyi* Erséus, 1980, *A. parviprostatus* Erséus, 1980, and *A. sphaeropenis* Erséus and Kossmagk-Stephan, 1982. However, in the remaining *Aktedrilus* species, including the two described in the present paper, the posterior "prostate" is in one way or another attached to, and communicating with, the base of the penis and/

or the wall of the penial sac. In these latter cases, the term "prostate" is somewhat stretched, as the glands are no longer strictly confined to cells emerging from the inner epithelium of the atrium. Instead they appear to comprise elements also from the epithelium of the penial sac. The ontogenetic events leading to the formation of these (possibly mixed) posterior glands have not yet been studied, but some authors (KNÖLLNER, 1935; FINOGENOVA and SHUROVA, 1980) have suggested the term "pseudoprostates" for them.

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